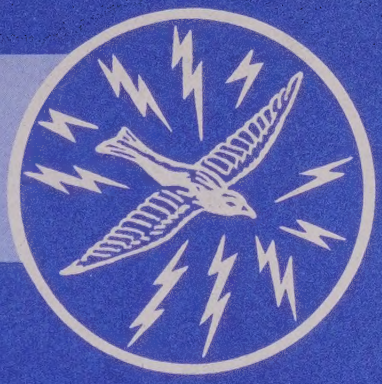
BIRD



INSTRUCTION MANUAL for

Termaline® Coaxial Load Resistor model 8890

Instruction Book
for
Model 8890
RF Load Resistor

SUMMARY SPECIFICATIONS

Power Rating	2.5 kW Continuous Load 5.0 kW with BA-88 Blower
Impedance	50 Ohms nominal
Input Connector	Female LC normally supplied uses Bird "QC" type
VSWR	1.1 to 1, DC to 1 GHz 1.25 to 1, 1 to 1.5 GHz
Operating Position	Horizontal only, vent plug up
Ambient Oper. Temp.	-40°C to +45°C max.
Finish	Light Navy Gray Enamel
Weight	33 pounds
Overload Interlock*	Install Thermoswitch #8890-008

*Optional extra equipment

MODEL 8890 DUMMY LOAD

SECTION I - GENERAL DESCRIPTION

The Model 8890 TERMALINE Dummy Load is designed as a low reflection and non-radiating termination for coaxial RF transmission lines, to aid in the tuning and trouble-shooting of transmitting equipment within its rating. Electrical specifications pertaining to the Model 8890 are contained in Summary Sheet, page A.

The Model 8890 Dummy Load is self-contained. No additional equipment or outside power source is required. An accessory thermoswitch (Bird #8890-008) may be used in conjunction with this load to prevent damage which could occur from accidental transmitter power overload.

Attached to the front and rear fins are mounting flanges. These flanges act as supports for free standing use in portable applications, or as mounting brackets for optional fixed installation. There are mounting holes provided in the flanges for this purpose, see INSTALLATION, Section III.

The RF input connector is located on the front face of the unit. The connector is a Bird special Quick-Change design, see Section V, MAINTENANCE.

The Load unit is filled with a specially selected dielectric coolant. At the top of the Dummy Load is a vent plug to relieve internal pressure resulting from coolant expansion.

SECTION II - THEORY OF OPERATION

The Model 8890 equipment consists essentially of a carbon-film-on ceramic resistor immersed in a dielectric coolant. The resistor, which is individually selected for its accuracy, is enclosed in an exponentially tapered housing. This construction provides a linear reduction in surge impedance, directly proportional to the distance along the resistor. When the resistor and housing are surrounded by the dielectric coolant, the characteristic impedance is therefore 50.0 ohms at the front (connector end), 25 ohms at the mid-point - to compensate for the resistance already passed over, and zero ohms at the rear where the resistor joins the housing - forming the return conductor of the coaxial circuit. This produces uniform, practically reflectionless line termination over the stated frequencies of the load resistor.

The dielectric coolant, is a low volatility, high-flash point synthetic oil, is chosen for its desirable dielectric properties and thermal characteristics, to which the diameters of the resistor housing are matched.

A synthetic rubber O-ring around the outside of the resistor housing mount furnishes a seal for the radiator opening. A beveled flange retains the O-ring. This flange, with the O-ring between, is pressed against the radiator face by the resultant action of the drawing up of the radial V-band clamp around opposing beveled flanges of the radiator and the resistor housing.

When input power is applied, the resistor generates heat in the adjacent dielectric coolant. By convection, the heated oil flows through openings in the coaxial shell to the walls of the fabricated metal tank. The series of radiating fins, which are integrally brazed with the tank, transmits the heat of the dielectric coolant into the surrounding air.

SECTION III - INSTALLATION

The Model 8890 Dummy Load is equipped for either fixed installations or portable use. There are mounting brackets on the front and rear faces of the unit. The Load may stand free or be fastened to a bench, etc., by means of four suitable fasteners. Four 3/8" mounting holes, to be used with suitable screws up to 5/16" diameter, are arranged in a 5-3/8" x 21-1/4" base rectangle.

This equipment is designed for operation in a horizontal position only, with mounting brackets down. NOTE:- DO NOT OPERATE IN ANY OTHER MANNER.

SPECIAL CAUTION

Before placing the unit into operation, remove the shipping plug and substitute with the specially shielded breather plug. Use a 3/4" flat wrench for this purpose - do not lose the O-ring seal.

This vent hole must remain open at all times when the unit is in operation or cooling. Failure to do this could result in damage to the equipment and endanger the operator's safety. The use of this vent plug also protects the filter opening against intrusion of foreign material while allowing unobstructed venting of the tank. The shipping plug (with O-ring seal) should be replaced whenever the unit is to be transported.

SECTION IV - OPERATION

Connect the Model 8890 Coaxial Load to the RF generator under test with 50-ohm coaxial transmission line such as RG-218/U or RG-213/U. Make sure all connections are properly tightened. Avoid the use of adapters and elbows whenever possible. Proceed according to the instructions pertaining to the specific transmitting equipment.

Due to the difference in VSWR between the Dummy Load and the antenna, re-adjustment of the transmitter may be required when returning to the original antenna.

SECTION V - MAINTENANCE

1. General

The Model 8890 TERMALINE is rugged and simple. It should require only nominal routine attention. The Load is designed to operate for long periods of time if care is taken not to exceed its power handling capabilities.

The outside surface of the instrument should be wiped free of dust and dirt when necessary. Clean the RF input connector with a good dry cleaning solvent such as Inhibisol, or its equivalent, on a cotton swab stick. Take special care to clean the metallic contact surfaces carefully and the exposed faces of the teflon insulator.

CAUTION

Provide adequate ventilation and observe normal precautions to avoid skin contact when using dry solvents.

2. Load Resistor

Accurate measurement of the dc resistance between the inner and outer conductors of the input coupling will provide a good check of the condition of the load resistor. For this measurement, a Resistance Bridge with an accuracy of one percent or better at 50 ohms (such as the Leeds & Northrup Model 5305 Test Set) should be used. Use low resistance leads, preferably a short piece of 50 ohm cable with clips or mating connector which can attach to the input connector of the Dummy Load. When the resistor is checked at room temperature, the measured resistance should not deviate more than one ohm from the value stamped on the blue tag attached to the load. If the value obtained materially exceeds this allowance, the load resistor may need replacement.

To change the load resistor assembly, place the unit on back end (connector up) and loosen the #10-32 x 1-1/2" screw on clamping band.

Remove the clamping band, and lift load resistor assembly out of the tank - be careful to allow coolant to drip back into the tank. This unit is not subject to further disassembly by field maintenance, and a defective unit should be replaced in its entirety. Before replacing a load resistor, be sure that the O-ring seal is properly placed and in good condition. It should be free of twists and positioned evenly all around the beveled flange of the resistor housing.

To replace housing assembly, reverse procedure described in paragraph above.

3. Coolant

The level of the dielectric coolant should remain constant in the unit after prolonged usage under normal operating conditions. Inspect occasionally around lower portion of the clamping band for possible coolant leakage. Tighten clamping screw if required. Under very unusual conditions it might become necessary to replace the resistor housing seal O-ring. Proceed as described in paragraph 2, Load Resistor, above.

Check coolant level with shipping plug removed from filler socket (Adapter) on the top surface of the unit. Coolant level should be within 3 to 3-1/4 inch below the top surface of the filler socket. The unit is factory-filled to the proper level with 1.7 gallons of dielectric fluid. NO OTHER COOLANT MAY BE USED.

When the coolant oil is heated, thermal expansion causes an increase in internal pressure. A vent plug is provided in the top of the radiator tank to relieve this pressure. Be sure this breather (vent plug) is always in place when the Load Resistor is used.

4. RF Input Connector

The input connector is of a special Bird Quick-Change "QC" design which permits easy interchange of connectors with only simple tools. This process does not in any way disturb the coolant seal or interfere with the essentially low VSWR (reflectance) of Coaxial Load Resistor. Normally a Female LC connector is supplied with Model 8890.

If replacement of the RF input connector becomes necessary, proceed as follows:

(1) Remove the four #8-32 x 5/16" pan head machine screws from the corners of the RF connector flange.

(2) Pull connector straight out.

(3) Reverse the above procedure to install new connector, making certain that the projecting center contact pin of the "QC" connector is carefully engaged and properly aligned with the mating socket of the Load Resistor face. Rotational position of the connector flange is immaterial.

The "QC" connector may be readily replaced, as above, with other AN Standard Type connectors specially obtained from Bird Electronic Corporation. Other "QC" connector types available from the manufacturer are as follows:

TYPE	PART NO.	TYPE	PART NO.	TYPE	PART NO.
Female N	4240-062	Female LC	4240-031	Female C	4240-100
Male N	4240-063	Male LC	4240-025	Male C	4240-110
Female HN	4240-268	Female LT	4240-018	Female UHF	4240-050
Male HN	4240-278	Male LT	4240-012	Male UHF	4240-179
		7/8" EIA	4240-002		

Model 8890

TABLE OF REPLACEABLE PARTS

Part Number	Name and Description	Locating Function
2450-100-1	RADIATOR, COOLING: Rectangular shape, 22-1/4 lg x 10-3/4 h x 6-3/8 w. Transverse vertical fins brazed at 1/2-inch intervals to central tank; integral construction. 4 in. dia. opening at front, filler hole at top, with foot brackets front and back. Al. Alloy, Light Navy, Gray baked enamel. (MIL-E-15090).	Housed RF load resistor assembly and dielectric coolant.
8890-029	LOAD RESISTOR, RF: Tapered and slotted coaxial line with 50-ohm load resistor center conductor. 4-1/2" dia. x 19-1/2 lg. Al. Alloy.	Housed in radiator, non-reflecting termination for RF power.
5-267	COOLANT: Dielectric fluid.	Dielectric coolant.
5-230	O-RING, SEAL: 4 x 4-1/4 x 1/8, nominal.	Seals against coolant leakage around mount of RF sub-assy.
2430-055	CLAMPING BAND: 4-5/8 O.D. x 1/4 V-band with two clamping blocks (one threaded) and 10-32 x 1-1/4 Fil. Hd. M.S. Stainless steel, gray nickel plate.	Holds load resistor to radiator.
5-504	O-RING, SEAL: 7/16 x 1/16, nominal.	Seals coolant vent valve assy.
5-835	VALVE, VENT: 3/4 hex - 9/16 x 18 thds. Brass, gray nickel.	Vapor pressure relief, weather-proof.
2450-049	PLUG, SHIPPING: 3/4 hex, 1/2in. overall 9/16 x 18 thread. Brass, gray nickel plate.	Replace Vent Valve for shipping purposes.
8890-008*	THERMOSWITCH, OVERLOAD: 1-1/8 hex plug, 5/8 Body, 9 lg overall. Brass, N. Plate. Includes Body #8890-005 and Conn. Assy. #2450-018.	Transmitter interlock. Cuts-off at 236°C.

*Optional equipment, provided only when specially ordered.

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